

Appl. No. 10/699,130
Amdt. Dated June 22, 2006
Reply to Office Action of March 23, 2006

• • R E M A R K S / A R G U M E N T S • •

The Official Action of March 23, 2006 has been thoroughly studied. Accordingly, the changes presented herein for the application, considered together with the following remarks, are believed to be sufficient to place the application into condition for allowance.

By the present amendment, independent claim 1 has been changed to recite that the inner surface of the first molded form is formed with "recesses that are complementarily shaped to individual one of the components of the electrical assembly."

In addition, independent claim 1 has been changed to recite that the printed circuit board is secured between the first and second molded forms "so that the circuit board is enclosed between the first and second molded forms and so that individual components of the electrical assembly are received in a recesses formed in the first molded form that are complementarily shaped to individual ones of the components of the electrical assembly so as to protect the electrical assembly from damage caused by at least one of vibration, shock and thermal changes."

The preamble of independent claim 9 has been changed to recite "a method of fabricating a molded form used to enclose and protect an electrical assembly provided on a printed circuit board."

Independent claim 9 has further been changed to recite that the mold includes "protrusions that are complementarily shaped to individual ones of the components of the electrical assembly."

Further, independent claim 9 has been changed to recite the step of injection

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molding a molded form using the mold which molded form is configured to enclose and protect an electrical assembly provided on a printed circuit board, the molded form having recesses formed by the protrusions, which recesses are complementarily shaped to individual ones of the components of the electrical assembly and configured to receive individual ones of the components of the electrical assembly.

Finally non-elected claim 21 has been canceled without prejudice or disclaimer.

Applicant preserves his right to seek patent protection for the subject matter of claim 21 by filing and prosecuting a divisional application.

As requested by the Examiner, applicant hereby affirms his election of claims 1-20 which were subject to a Restriction Requirement.

Claims 1-20 are pending in this application.

Claims 1-5 and 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,701,999 to Palmer.

Claims 6 and 7 stand rejected 35 U.S.C. §103(a) as being unpatentable over Palmer in view of U.S. Patent No. 4,701,999 to Harding.

Claims 9, 10 and 13-20 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,543,103 to Hogan et al.

On page 7 of the Office Action the Examiner has objected to claims 11 and 12 as being dependent from a rejected base claim, but has otherwise indicated that the limitations of claims 11 and 12 are allowable over the prior art.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art or record and therefore, each of the outstanding prior art rejections should properly be withdrawn.

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Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Palmer as teaching:

...the basic claimed method of protecting an electrical assembly comprising providing pre-molded forms, and securing the assembly between the forms to protect from damage caused by the environment. The detailed method steps include providing an integrated circuit chip attached to a lead frame, wherein the device may be preassembled prior to molding (see col. 5, lines 20-25), and providing a solid bottom wall insert 48 and a solid top wall cap 50. Both the bottom wall insert 48 and top wall cap 50 may be preformed prior to assembly by any conventional molding technique, including injection molding. The method is carried out by associating each insert and cap with the electrical assembly, and forming a sealed housing around the assembly. The method may further comprise the molding of a plastic rim for securely locating the cap and insert onto the assembly. See col. 6, lines 45-60; col. 7, lines 12-30, 34-65; col. 10, lines 5-25.

The Examiner concedes that Palmer "does not set forth a printed circuit board as claimed."

On page 3 of the Office Action the Examiner states:

Note that the lead frame set forth in the applied prior art reference is an alternative equivalent form of a board, as both are substrates for receiving the electrical components (or chips).

The Examiner accordingly takes the position that:

...it would have been obvious to one of ordinary skill in the art at the time the invention was made to use printed circuit boards for making a similar assembly.

The Examiner's determination of "alternative equivalents" between a lead frame and a circuit board (as claimed by applicant) is unpersuasive and at the very least fails to take into account that applicant's claimed circuit board having a topography defined by the size, shape and location of individual components of the electrical assembly.

In contrast to applicant's circuit board that has an electrical assembly formed

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thereon, a "lead frame" as shown in Palmer's Fig. 2 and described at column 4, line 60 through column 5, line 33 merely includes an array of conductive leads that are configured to connect between a chip and a circuit board to which the chip is attached.

Substituting a circuit board for the lead frame in Palmer is not at all practical - or obvious under 35 U.S.C. §103.

Moreover, even if possibly, such a substitution would have the circuit board extending out of the sides of the plastic housing, and this would fail to read on applicant's claimed invention which requires that the circuit board is enclosed between the first and second molded forms so as to protect the electrical assembly found on the circuit board.

Further, independent claim 1 has been changed to recite that the inner surface of the first molded form is formed with "recesses that are complementarily shaped to individual one of the components of the electrical assembly" and that the printed circuit board is secured between the first and second molded forms "so that the circuit board is enclosed between the first and second molded forms and so that individual components of the electrical assembly are received in a recesses formed in the first molded form that are complementarily shaped to individual ones of the components of the electrical assembly so as to protect the electrical assembly from damage caused by at least one of vibration, shock and thermal changes."

As shown, Palmer does not even provide a truly or substantially complementarily shaped recess for the chip, let alone complementarily shaped recesses for individual components of an electrical assembly of a circuit board.

Accordingly, Palmer cannot be relied upon as rendering applicant's claimed invention obvious.

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The Examiner has relied upon Harding as teaching:

... as conventional a similar electrical package, wherein the molded caps include an embedded thermal conductor 20, 30. The conductors may be coated and over-molded with a plastic material, and then sealed together to form a covered electrical assembly. See col. 4, lines 5-50; col. 5, lines 40-68.

In combining the teachings of Palmer and Harding the Examiner takes the position that:

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include an embedded structure as shown in the added reference, when performing the process set forth in the primary reference, for molding a cap with a thermal conductor.

The Examiner's further reliance upon Harding does not address or overcome the differences between Palmer and applicant's invention as discussed above.

Like Palmer, Harding is directed to a chip that is packaged with a lead frame.

Harding does not teach enclosing a circuit board having individual components of an electrical assembly in a molded form after the form is molded.

The Examiner has relied upon Hogan et al. as teaching:

...the basic claimed method of accurately shaping the surface of a mold with a three-dimensional image as claimed. The detailed method steps include electronically scanning the object to be replicated, adjusting the three-dimensional image captured and projecting the image onto the surface of a mold. During the capture of the image, a two-dimensional copy is provided and adjusted accordingly. Using the corrected image, the image is displayed onto a mold that is milled and routed for accurately corresponding to the image, using a program and automated machines. The mold can then be used to mold any moldable material into the three-dimensional image formed. See col. 2, lines 55-68; col. 3, lines 1-40.

The Examiner states that:

It would have been obvious to one of ordinary skill in the art at the time the

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invention was made to provide and modify an electronic image, and form a mold using that image for reproducing molded three-dimensional articles having the image shape.

Hogan et al. is directed to a process in which a three-dimensional object is image-scanned and the electronic data from the image is used to operate a mill/router to form a three-dimensional reproduction of the original object.

Hogan et al. teaches that reproduction can be in turn used to make a mold by which to reproduce molded reproductions.

A fundamental difference between Hogan et al. and the present invention is that Hogan et al. teaches molding dimensional reproductions of a three-dimensional object.

Therefore, if the original object were, for example, a circuit board with several projecting electronic components, the reproduction would similarly have a plurality of projecting structures.

In contrast, applicant's invention involves fabricating a molded form used to enclose and protect an electrical assembly provided on a printed circuit board. As presently set forth in amended claim 9, the mold includes protrusions (See applicant's Fig. 4c) that are complementarily shaped to individual ones of the components of the electrical assembly and the molded form includes recesses formed by the protrusions (See applicant's Fig. 6), which recesses are complementarily shaped to individual ones of the components of the electrical assembly and configured to receive individual ones of the components of the electrical assembly.

Thus, applicant's invention is generally an opposite molding process as compared to Hogan et al.

Claim 9 has accordingly been amended to emphasize this difference.

The Examiner has stated that the intended use of a claimed invention must result in a

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structural difference between the claimed invention and the prior art. The Examiner further states that if the prior art is capable of performing the intended use, then it meets the claim.

In the present situation, claim 9 has been limited to both a molded form that is structurally distinguishable over the prior art and which is limited to use with circuit boards having electrical assemblies thereon.

In this regard, the preamble to claim 9 recites "a molded form used to enclose and protect an electrical assembly provided on a printed circuit board, and structural reference of the mold and molded form are made to the components of the electrical assembly on the circuit board.

The Examiner is referred to MPEP 2111.02 regarding the limitations in the preamble of a claim.

Further, claims 9 positively recites the step of "providing a printed circuit board having...."

Certainly claim 9 is limited to the use of circuit boards and molded forms that are configured to enclose and protect circuit boards.

As such, Hogan et al. is not related or relevant to applicant's claim 9.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a prima facie case of obviousness of applicant's claimed invention.

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It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

The prior art cited by the Examiner on page 7 of the Office Action has been noted. This prior art is not deemed to be particularly pertinent to applicant's claimed invention.

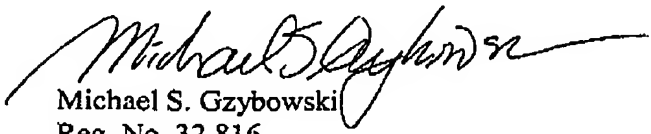
If upon consideration of the above, the Examiner should feel that there remain outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicant's patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of

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time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,


Michael S. Gzybowski
Reg. No. 32,816

BUTZEL LONG
350 South Main Street
Suite 300
Ann Arbor, Michigan 48104
(734) 995-3110

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